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**IMPLANTABLE MICROFLUIDIC DELIVERY SYSTEM USING  
ULTRA-NANOCRYSTALLINE DIAMOND COATING**

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**Abstract**

An implantable biocompatible microchip drug delivery substrate is coated with a thin film of ultra-nanocrystalline diamond; assuring that the device is biocompatible and impermeably sealed, to prevent the substrate from being dissolved by the living tissue and to protect the drugs from premature release or undesired reaction with the body fluids. The coating is selectively patterned by doping to create electrically conductive areas that can be used as an electrically activated release mechanism for drug delivery. The conformal ultra-nanocrystalline diamond coating uniformly covers the device, providing relief from sharp edges and producing a strong, uniformly thick impermeable coating around sharp edges and on high aspect-ratio parts. The ultra-nanocrystalline diamond coating provides a conformal coating on the biocompatible device, which is of approximately uniform thickness around sharp corners and on high aspect-ratio parts. The conformal nature of the coating assures impermeability and strength despite the presence of difficult to coat shapes.